Evaluation of the Correlation Between Herpes Simplex Virus-2 Infection and Adverse Birth Outcomes Among Rural Pregnant Women In Mysore District, India

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INTRODUCTION

Herpes simplex virus type 2 (HSV-2) is one of the most common sexually transmitted infection worldwide and the main cause of genital ulcers. Although HSV-2 prevalence varies among countries and population, it is more prevalent in developing countries rather than developed countries. The World Health Organization's census showed that 60% of women, globally, are HSV-2 infected. HSV-2 can be transmitted sexually, when ulcers or lesions are present, or when skin is broken. HSV-2 is a lifelong asymptomatic infection, however, antivirals can be used to suppress the virus shedding. People with HSV-2 are at increased risk for HIV acquisition and transmission, thus the increase risk of perinatal transmission. Infants exposed to HSV-2 during vaginal delivery are associated with low birth weight, premature birth, fetal malformations, or neurological disabilities.

OBJECTIVE

The objective of this project is to evaluate the prevalence of HSV-2 among pregnant women during childbirth and the correlation HSV-2 has with adverse birth outcomes.

MATERIALS AND METHODS

Blood samples were collected from pregnant women from Mysore subdistrict, India, in a previously completed project that Public Health Research Institute of India (PHRII) conducted in 2011-2014 called **S**aving **C**hildren **I**mproving **L**ives (SCIL). All women were administered informed consent prior to the blood draw. Pregnancy outcomes were documented immediately after birth, and 3 and 6 months after delivery. From the SCIL study, 306 random serum samples were analyzed based on their adverse birth outcomes. HerpeSelect 2 ELISA IgG kit (Focus Diagnostics, USA) was used to test the serum samples for HSV-2 specific antibodies. Samples that were equivocal or close to equivocal, above 0.75 Index Value (IV), were retested in in a separate ELISA plate. An HSV-2 IgG/IgM Rapid Test kit was also used to retest the ELISA positive serum samples, as well as the samples that differed between the two ELISA tests.

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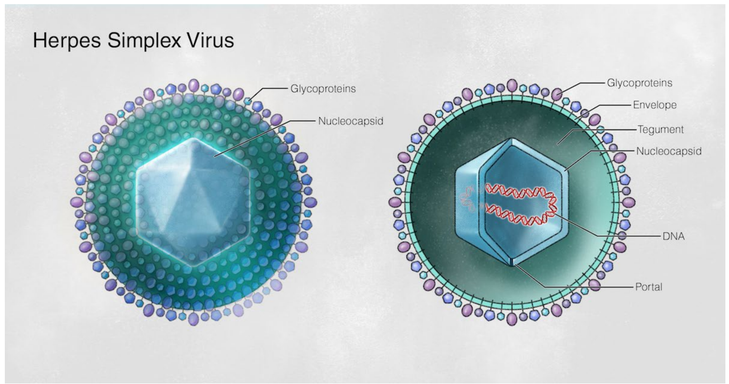

Of the 306 women tested during childbirth from rural areas of Mysore, India, 5.6% were positive for genital herpes

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RESULTS

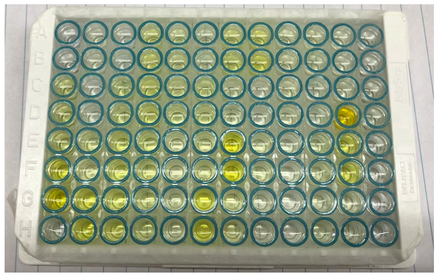

Figure 1. HSV-2 ELISA.
Figure 1 shows the last ELISA plate that was performed during this project. The yellow wells are the positive results. Each sample is placed into two wells. This plate was then inserted into the spectrophotometer to determine the absorbance level.

Figure 2. HSV-2 IgG/IgM Rapid Test.
This test was used to reinforce the results from the ELISA. The line next to C confirms that the test is valid. Since there is a line next to G, this sample is positive for HSV-2 IgG antibody. Since a line is absent next to M, there were no IgM antibodies detected.

True Positive (IV > 3.5)
Low Positive (3.49 > IV > 1.11)
Equivocal (1.10 > IV > 0.9)

Table 1. Ranges that determine the results from the ELISA
These ranges were used for the Index Values (IV) which determine whether each well is positive, equivocal or negative. The IV is calculated from the absorbance reading and the average of the Cut-Off Calibrators.

Table 2. Results from all the ELISA
These are the results from all 8 ELISAs using the ranges from Table 1. Some samples were tested twice using the ELISA. Samples that were positive, equivocal or differed between the two ELISA tests were tested with the Rapid Test, shown in Figure 2.

Total Number of Samples = 306
True Positive Total = 9
Low Positive Total = 8
Equivocal Total = 2
Samples that differed from two tests = 11

CONCLUSIONS

Out of the 306 serum samples tested, 17 (5.6%) samples were positive, nine (2.94%) were high positive, eight (2.61%) were low positive, two were equivocal and the remaining serum samples were negative. The HSV-2 IgG/IgM Rapid test detected nine samples positive for HSV-2 IgG antibodies; eight from the high positive and one from the low positive serum samples. Data will be analyzed for correlation between positive serum samples and the birth outcomes. Informing the HSV-2 positive women and offering treatment will reduce HSV-2 transmission rate and birth defects.